



CONNECTING
THE WORLD



NF 23

CONNECTING
THE WORLD

Niagara Today and Tomorrow

A technical news update

Ausra Morkunaite

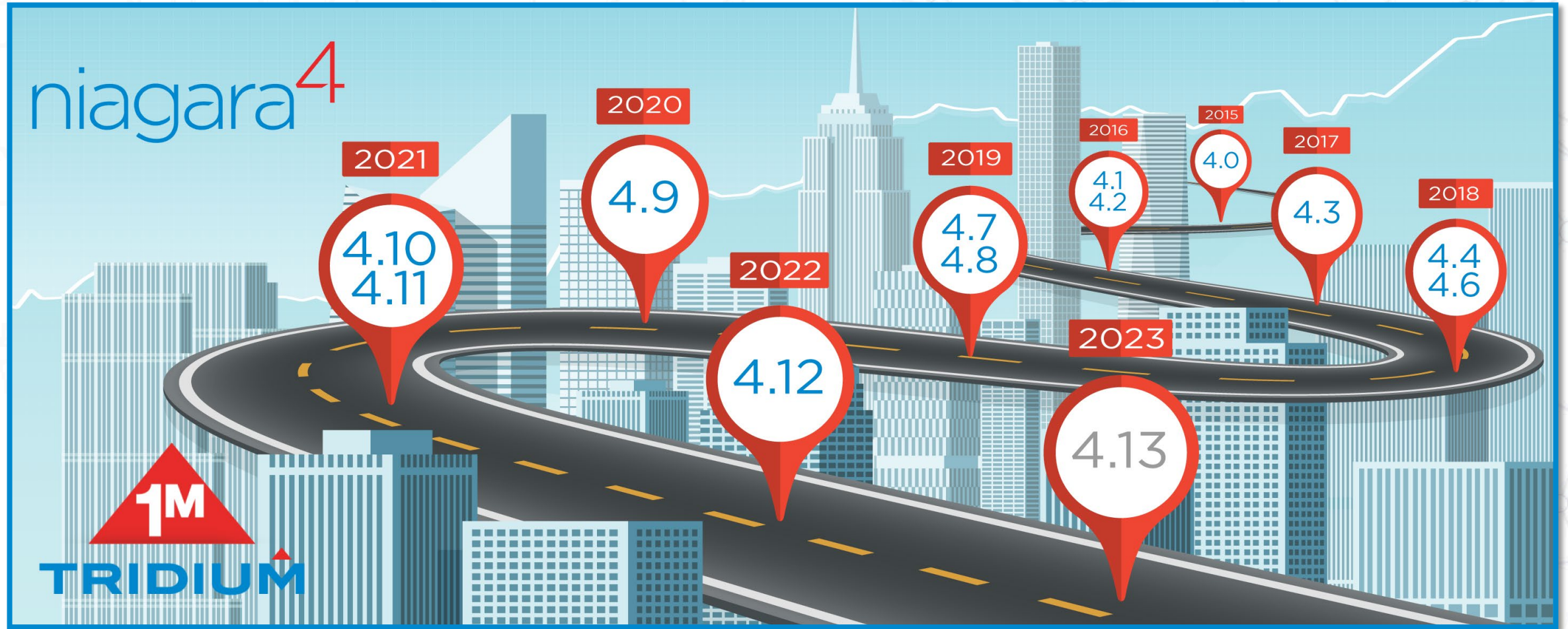
Tony Hardwick

Chris Riccobono

Mike Smith

niagara TODAY

Niagara Timeline – Always Evolving



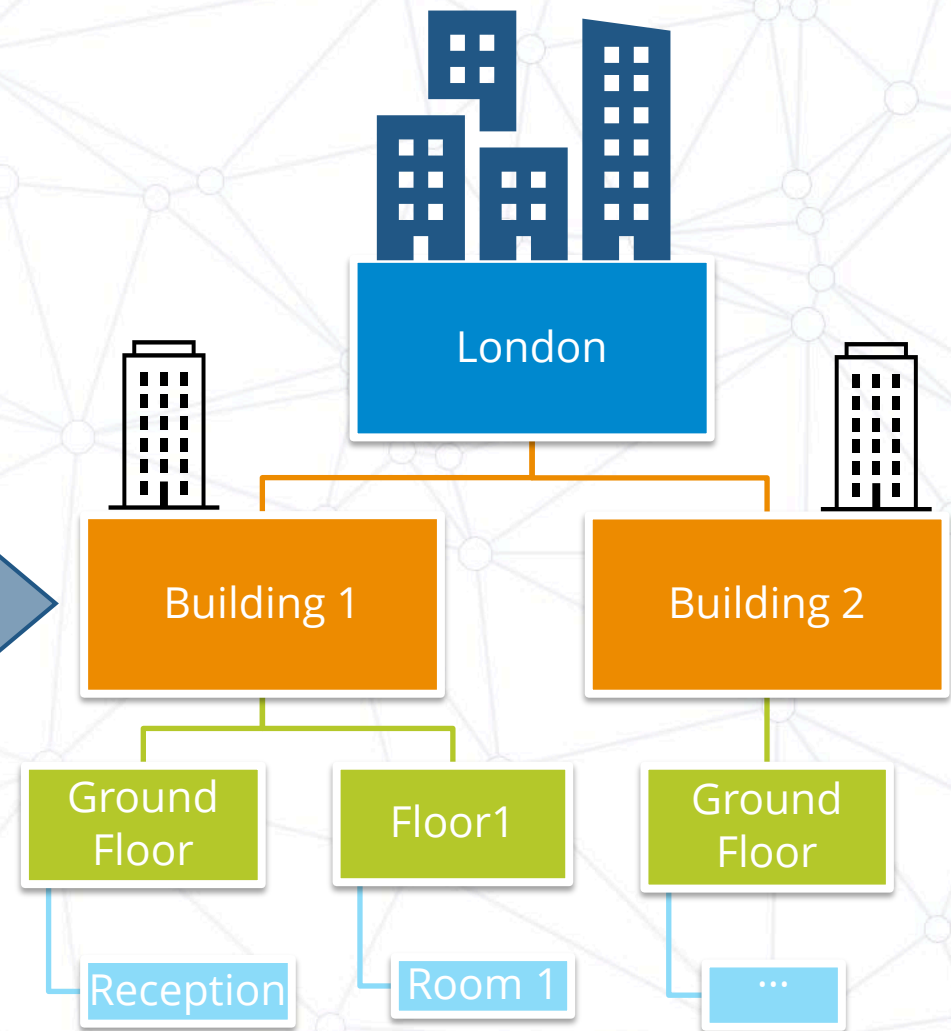
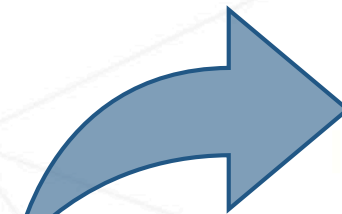
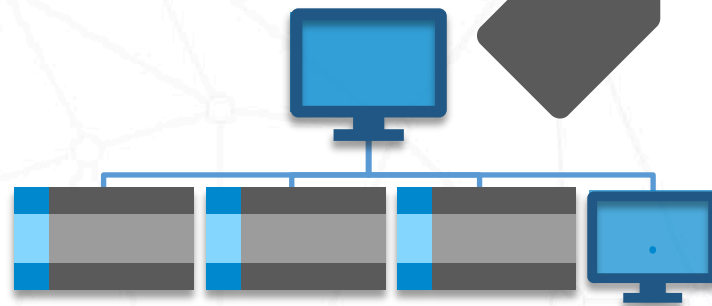
Metadata Modelling

4.6

System Database

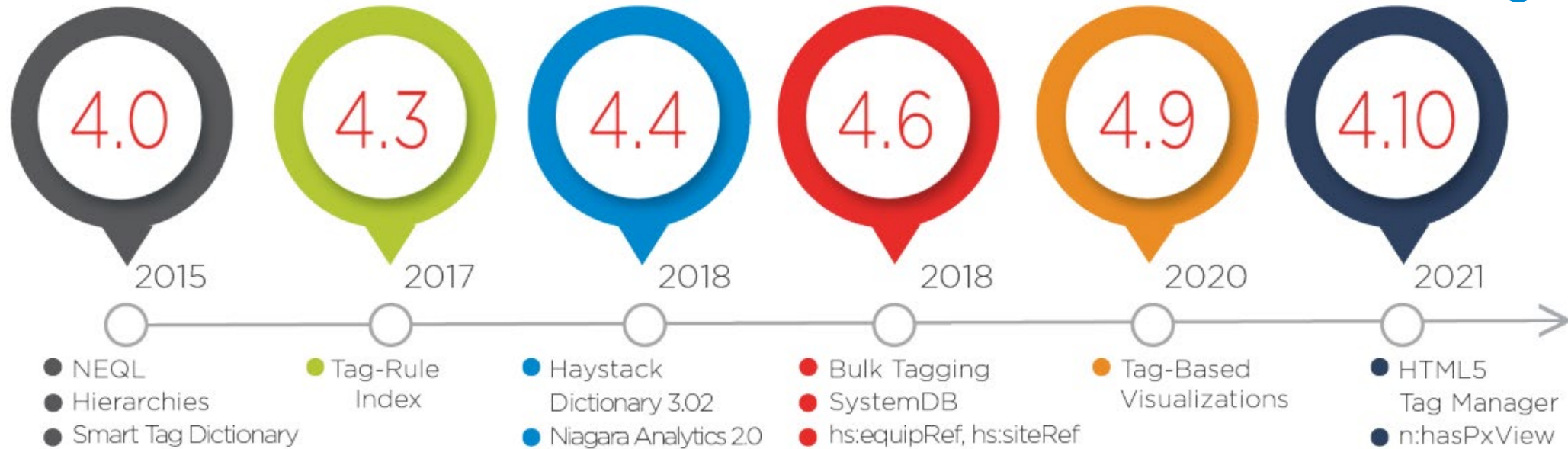
4.9

Tag-based graphics



Tagging Improvements

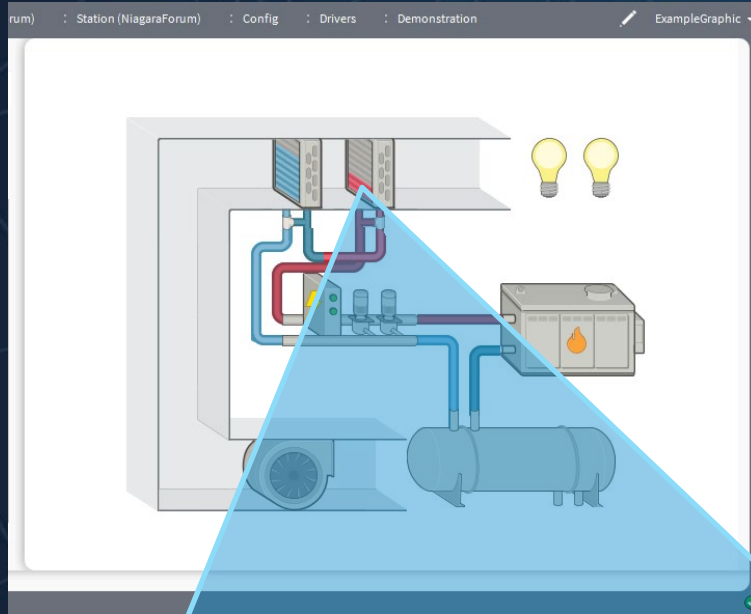
niagara⁴ Tagging Support Timeline



Archive Providers for Histories and Alarms



Tag-based graphics



4.9

Introduced

4.10

System DB Support

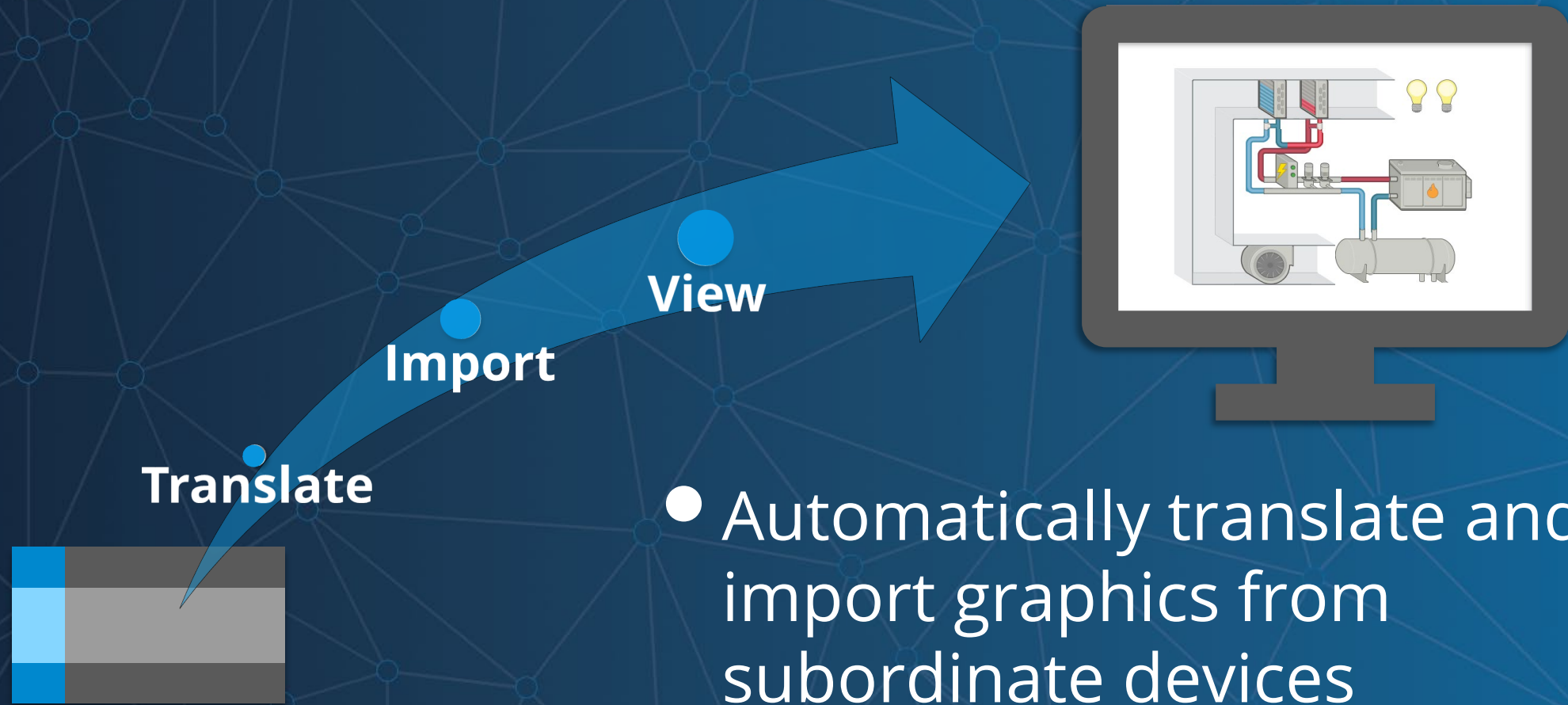
Value Binding

ord

neql:traverse hs:equipRef->|neql:my:heatcoil|single:

None

Virtuals on Demand



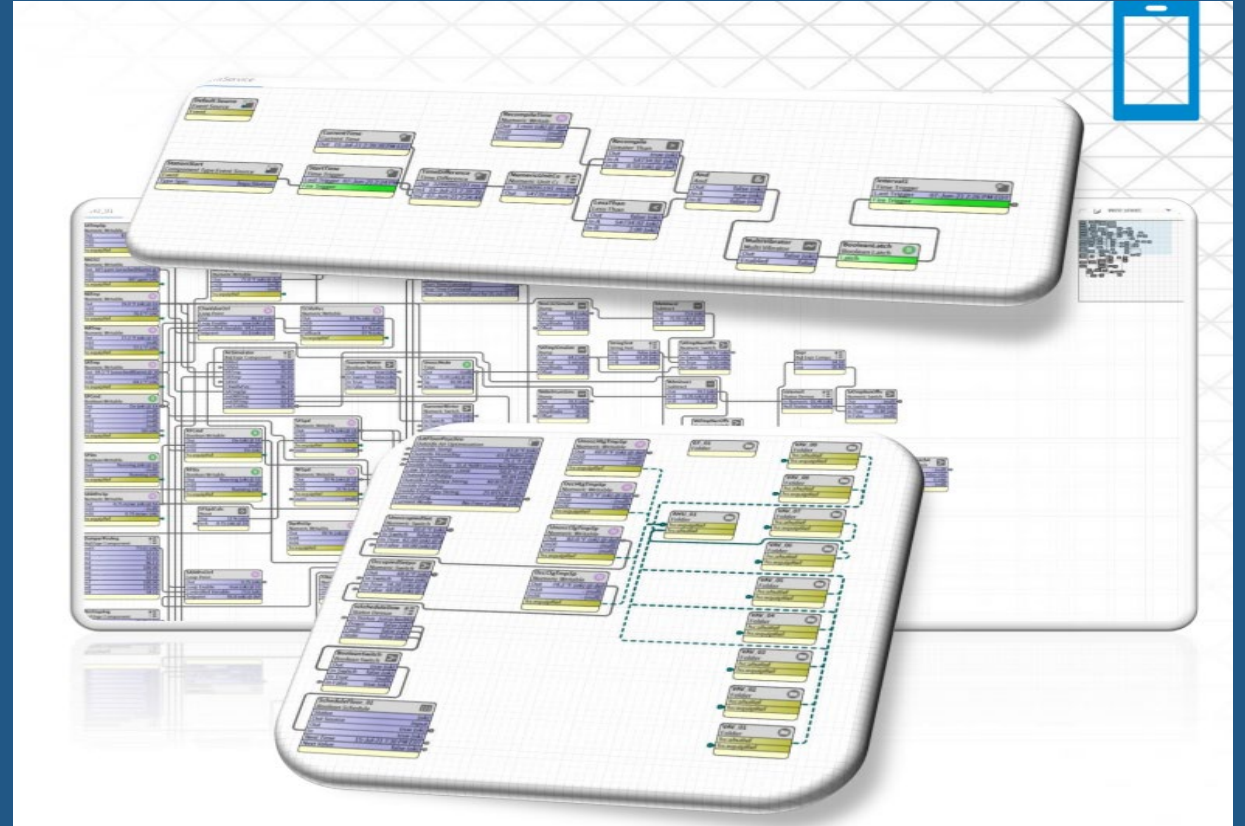
HTML5 Views

4.10

Tag Manager

4.12

Niagara Network
BQL Builder
WebWiresheet



BoilerControl

127.0.0.1/ord/station:%7Cslot/Software/BoilerControl%7Cview:wiresheet:WebWiresheet

Wire Sheet

Nav

- Config
 - Services
 - Drivers
 - NiagaraNetwork
 - Demonstration
 - PxViewTag
 - EnumWritable
 - Setpoint**
 - StatusDemux
 - BooleanWritable
 - GivStatus
 - BuildLocalOrdMap
 - BacnetNetwork

Palette

- alarm
- baja
- control
- history
- kitControl
- schedule

Setpoint

Out	32.1 (ok) @ def
In10	- (null)
In16	- (null)

FlowTemp

Out	30.0 (ok) @ def
In10	- (null)
In16	- (null)

ReturnTemp

Out	25.0 (ok) @ def
In10	- (null)
In16	- (null)

Link To SP

BoilerControl

127.0.0.1/ord/station:%7Cslot/Software/BoilerControl%7Cview:wire...

Wire Sheet

Nav

Config

Setpoint [Source]

Facets

- Out
- In1
- In2
- In3
- In4
- In5
- In6
- In7
- In8

Setpoint [Target]

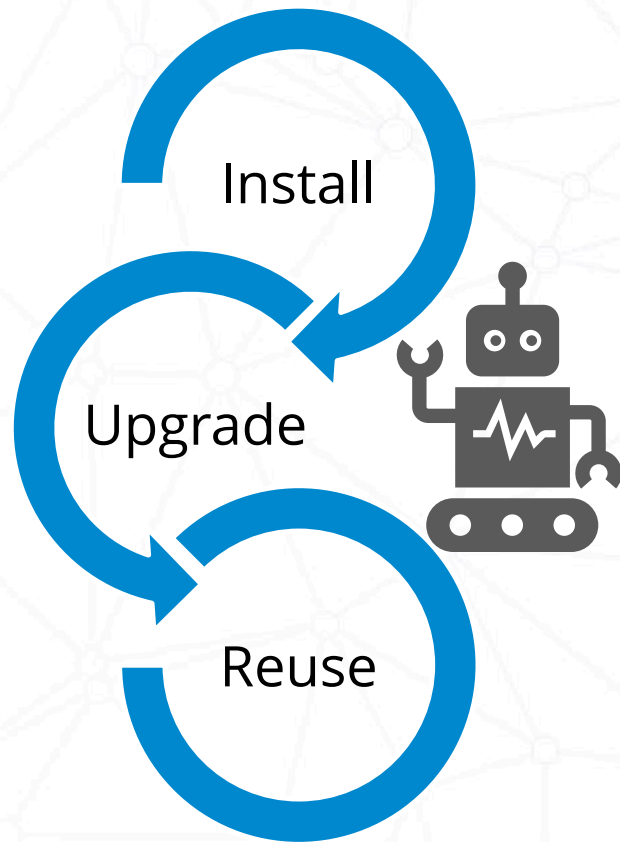
Facets

- Out
- In1
- In2
- In3
- In4
- In5
- In6
- In7
- In8

Swap

OK Cancel

Making things easy



4.6

Template provisioning

4.7

Enhanced provisioning tools

4.11

Provisioning enhancements

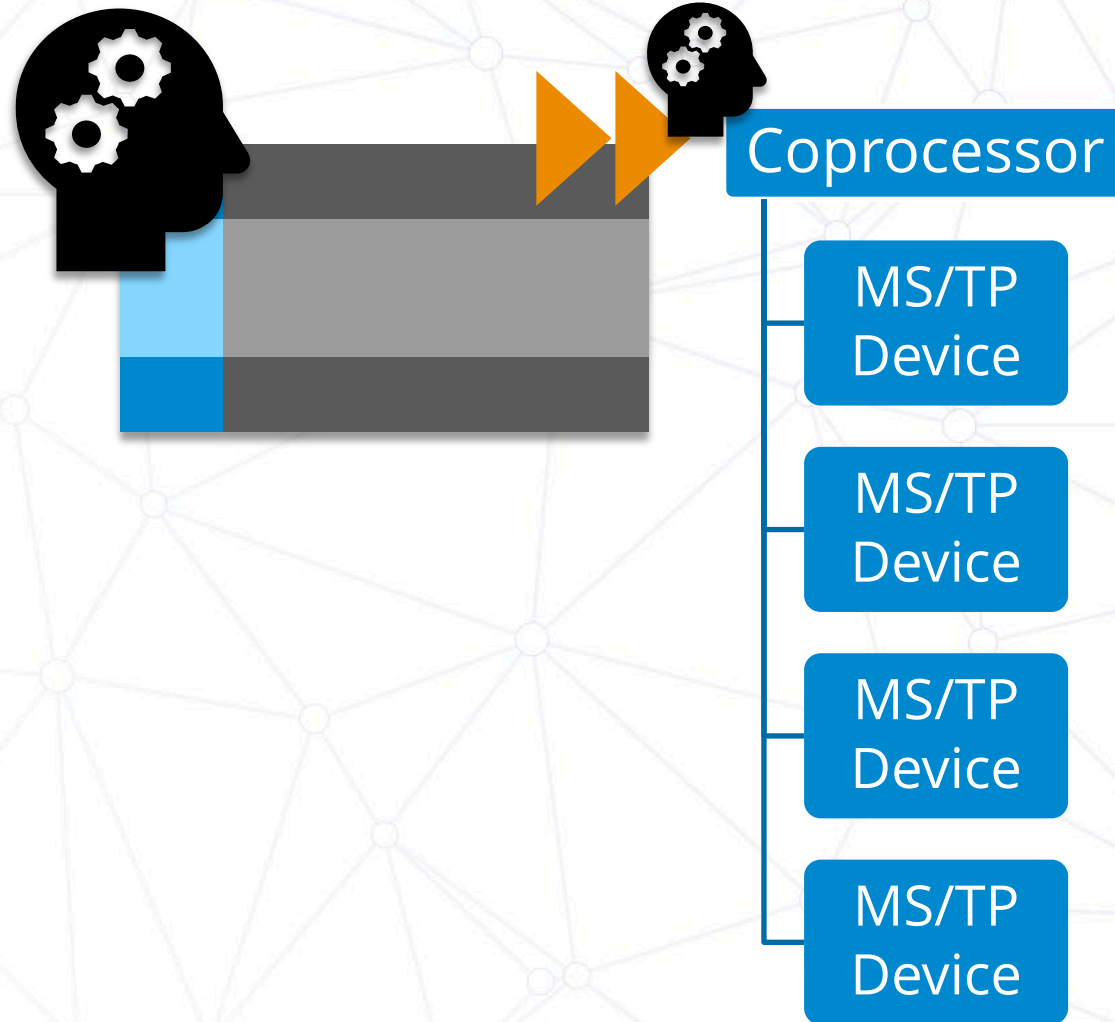
Single Sign-on

- SAML
- IdP



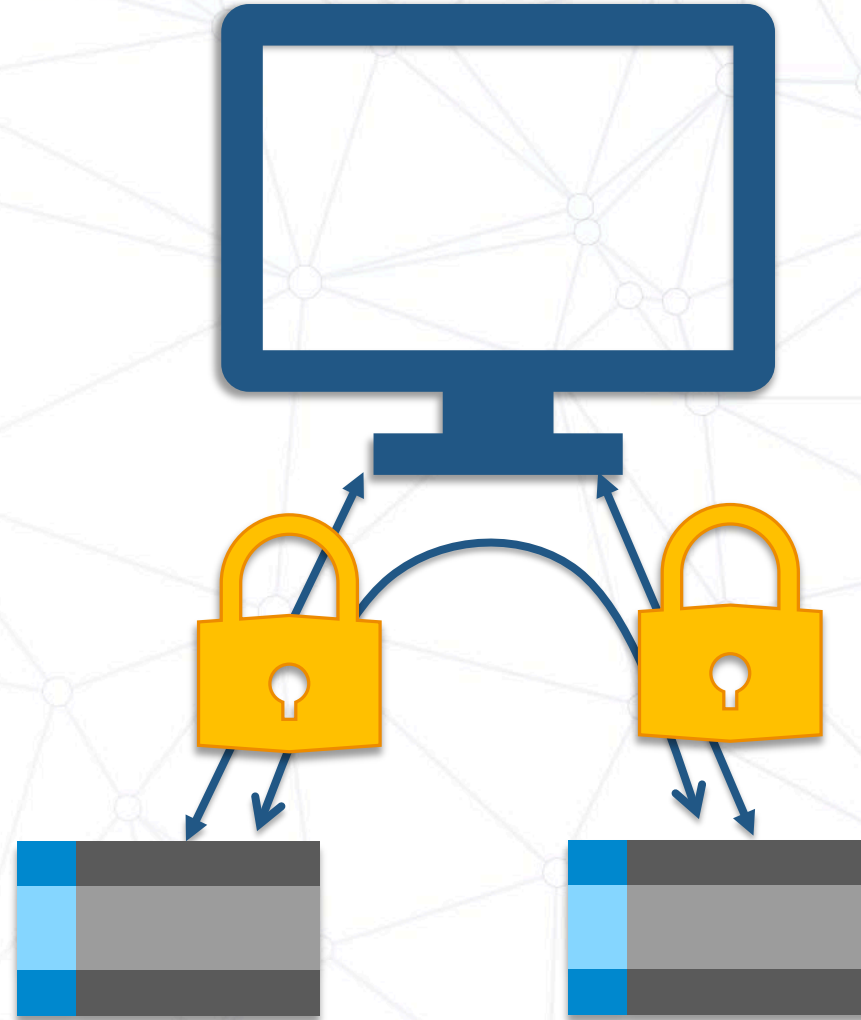
BACnet MS/TP improvements

4.12



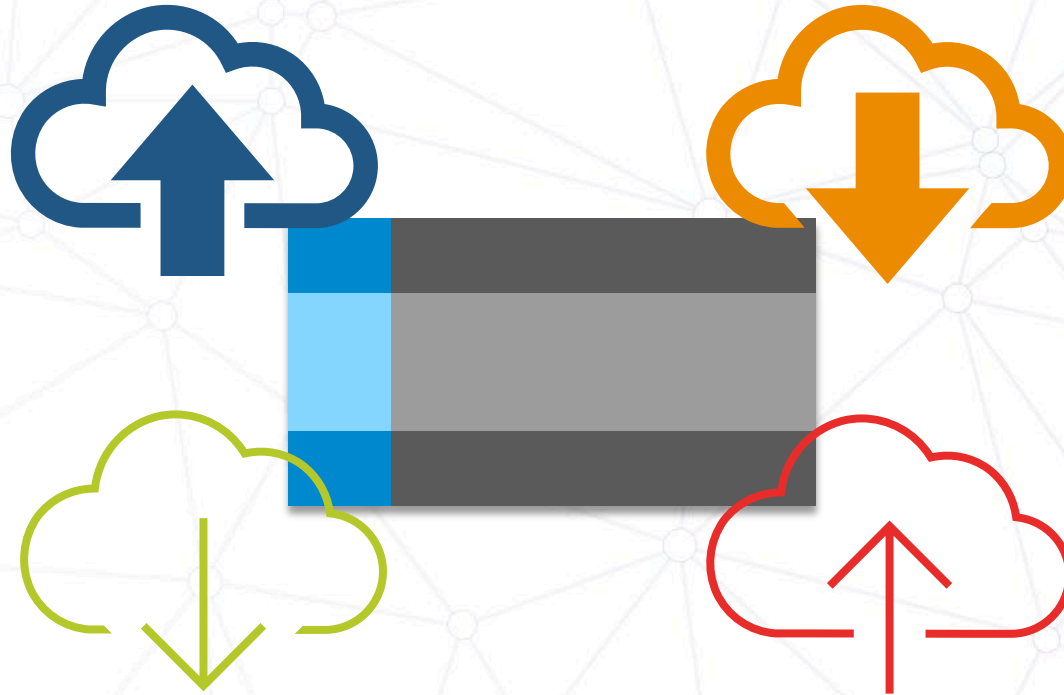
BACnet Secure Connect (BACnet/SC)

4.11

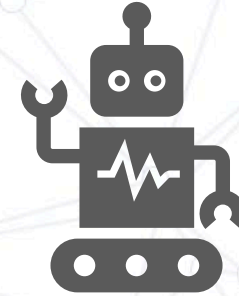
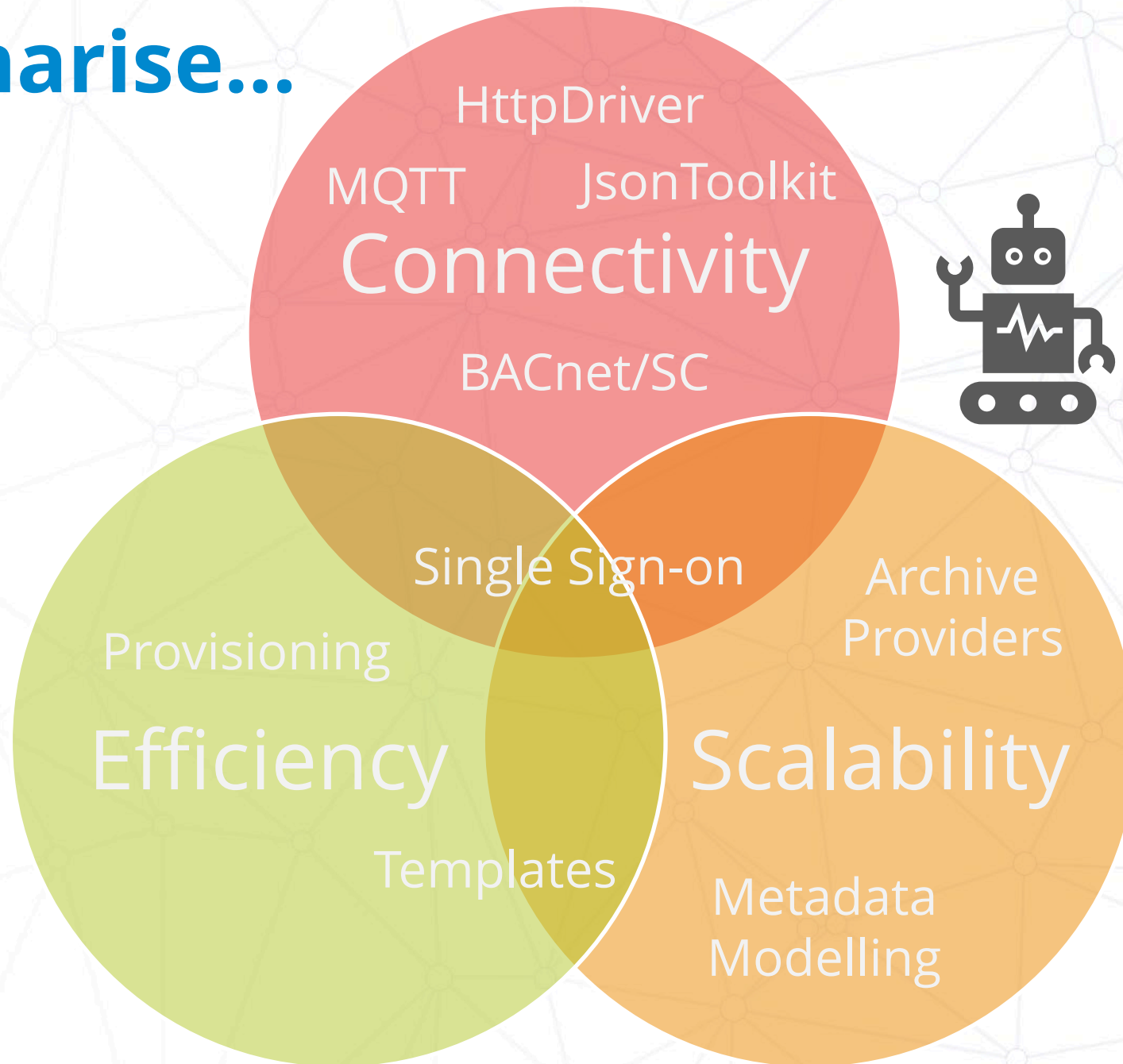


Web Connectivity Tools

- MQTT
- HTTPDriver
- JSON Toolkit



To Summarise...





niagara 4.13

*Always Evolving
Along Niagara's
5 Product
Dimensions*



Niagara 4.13 | Features



Visualization

HTML5 Station Manager
HTML5 Certificate Manager
Baseline time-series for Analytics



Deployment

Multi-tiered SystemDB
Containerization
Subscription Licensing
Edge Template +
Deployment Upgrades
Unattended Installer



Connectivity

OAuth for Email Services
Replication and Workflow
Hardening for Enterprise Security



Security

Certificate Manager
Enhancements
Critical Support/Enhancements



Certification & Compliance

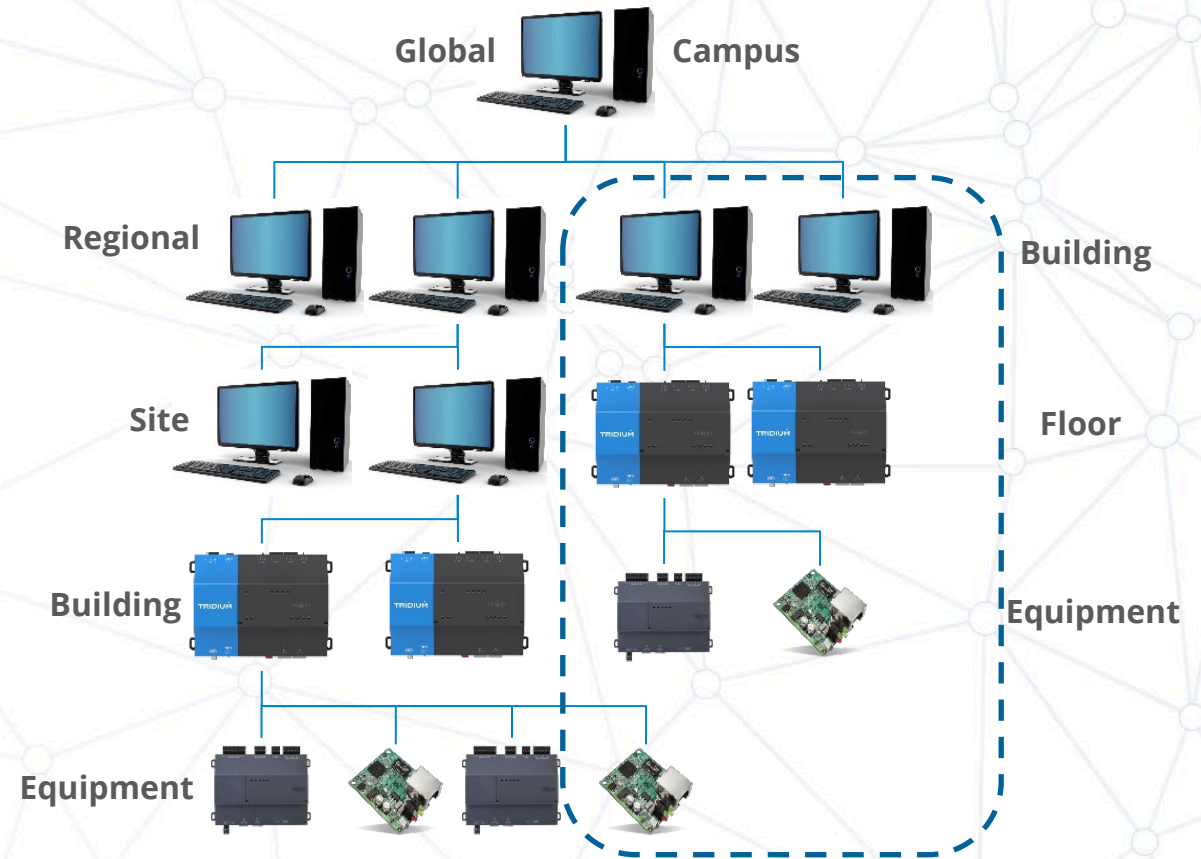
Haystack 4 Support
Syslog Integration

MULTI-TIERED SYSTEM DB

**Niagara System Architecture
Flexes to Any Layout**

**Query Entire Niagara System
From A Single Database Location**

**Expedite UI Configuration Through
Hierarchies and Virtual Px Views**



MULTI-TIERED SYSTEM DB

Expanded the functionality and benefits of Niagara's System Database and Indexing to support vast architecture layouts with:



Reachable
Stations



Multi-tiered
Indexing



Multi-tiered
Virtual Px

Niagara's System Database and Indexing establishes an entity data model to enable querying of the entire Niagara system from a single location

Design more intuitively. Design more efficiently!

HTML5 NIAGARA NETWORK STATION MANAGER VIEW

Eliminating a dependency on workbench eliminates the 'module-and-version-dependency' guessing game.
Open a browser, login, and GO!

The screenshot shows the Niagara Network Station Manager interface. On the left is a navigation pane with a tree structure: Config, Services, Drivers, NiagaraNetwork (selected), Apps, Folder, BooleanScheduleSelector, NumericWritable, EnumWritable, StatusEnumToEnum, Files, and Histories. The main area displays a 'Database' table with 2 objects. The table has columns: Name, Exts, Address, Host Model, Version, Status, and Health. Below the table are three callout boxes: a red box for 'Niagara Network Discovery and Database Panes', a blue box for 'Trace Descendants, Edit, Match and New Commands', and an orange box for 'Hyperlink to Certificate Manager'. At the bottom is a toolbar with buttons: New Folder, New, Edit, Discover, Cancel, Add, and Match. A 'Certificate Manager' button is also visible below the toolbar.

Name	Exts	Address	Host Model	Version	Status	Health
Floor_01	[Icons]	ip:172.31.66.110	Workstation	4.12.0.116	{unackedAlarm}	Ok [07-Dec-22 10:41 AM EST]
alarm	[Icons]	ip:localhost	Workstation	4.13.0.103	{ok}	Ok [07-Dec-22 10:41 AM EST]

Niagara Network Discovery and Database Panes

Trace Descendants, Edit, Match and New Commands

Hyperlink to Certificate Manager

Buttons: New Folder, New, Edit, Discover, Cancel, Add, Match, Certificate Manager

CERTIFICATE MANAGEMENT SIMPLIFIED

Browser (HTML5 View) access without need for Workbench; useful to IT network admin persona

CertManagerService Certificate Management for "localhost"

Alias	Subject	Not After	Key Algorithm	Key Size	Valid
newtest	newtest	15-Nov-2024 9:16 AM EST	RSA	2048	true
sp_privatekeyandcert	sp	16-Aug-2023 11:42 AM EDT	RSA	2048	true
pm_cs	Product Management Code Signing	06-Oct-2024 1:16 PM EDT	RSA	2048	true
client	client	30-Nov-2023 9:37 PM EST	RSA	2048	true
iamaca	iamaca	30-Nov-2023 4:32 PM EST	RSA	2048	true
jace8cert	jace8Cert	03-Oct-2025 9:10 AM EDT	RSA	2048	true
testingopc	chris	15-Nov-2023 10:57 AM EST	RSA	2048	true
aliasca	commonname	20-May-2023 4:03 PM EDT	RSA	2048	true
chriscert	riccobono	31-Oct-2024 5:57 AM EDT	RSA	2048	true
iamacient	iamacient	30-Nov-2023 4:31 PM EST	RSA	2048	true
pm_ca	Product Management CA	06-May-2025 9:09 AM EDT	RSA	2048	true
iamaserverux	iamaserverux	30-Nov-2023 4:35 PM EST	RSA	2048	true
edge10cert	edge10Cert	03-Oct-2025 9:12 AM EDT	RSA	2048	true
tridium	Niagara4	13-Nov-2024 11:47 AM EST	RSA	2048	true
default	Niagara4	28-Sep-2023 1:51 PM EDT	RSA	2048	true

View New Delete Cert Request Import Export Reset

CONTEXT-SENSITIVE
Subject Descriptors

Generate Certificate

Generates a signed or self-signed certificate and inserts it into the key

General Attributes

Alias [?] (required)

Distinguished Name (DN) [?] CN=, OU=, O=, L=, ST=, C=

Not Before [?] 04-Jan-2023

Not After [?] 04-Jan-2024

Key Algorithm ☒ RSA ☐ EC

Key Size [?] ☐ 1024 bits ☒ 2048

Certificate Usage ☒ Server ☐ Client

Distinguished Name (DN)

The Distinguished Name (DN) uniquely identifies an entity in an X.509 certificate. It consists of a sequence of Relative Distinguished Names (RDNs) such as Common Name, Organization, State, etc... These are type/value pairs. The Common Name (CN) can describe any entity. For example, the CN in a client certificate may represent an individual user, but the CN in a server certificate may be the hostname of the server.

OK

Type

Key Usage [?]

Key Usage

The key usage extension defines the purpose (e.g., encipherment, signature, certificate signing) of the key contained in the certificate. This is used to restrict the usage of a certificates key only to permitted operations. For example, a key that should only be used for key management should have the keyEncipherment bit set.

OK

CERTIFICATE MANAGEMENT & HTML5 VIEW

Enhanced UI aids in the setup & configuration of certificates

HTML5 INTERFACE

ELLIPTICAL-CURVE:
Key Algorithm

MORE EXTENSIONS:
Add 'A La Carte'

SAN: Supports a variety of identity types, including email, DNS name, directory name, uniform resource identifier (URI), IP address, registered ID



Generate Certificate

Generates a signed or self-signed certificate and inserts it into the key store

General Attributes

Alias ?	<input type="text"/>	(required)									
Distinguished Name (DN) ?	<input type="text" value="CN=, OU=, O=, L=, ST=, C="/>	? (required)									
Not Before ?	<input type="text" value="08-Dec-2022"/>	<input type="text" value="2"/> : <input type="text" value="15"/> PM EST									
Not After ?	<input type="text" value="08-Dec-2023"/>	<input type="text" value="2"/> : <input type="text" value="15"/> PM EST									
Key Algorithm	<input checked="" type="radio"/> RSA <input type="radio"/> EC										
Key Size ?	<input type="radio"/> 1024 bits <input checked="" type="radio"/> 2048 bits <input type="radio"/> 3072 bits <input type="radio"/> 4096 bits										
Certificate Usage	<input checked="" type="radio"/> Server <input type="radio"/> Client <input type="radio"/> CA <input type="radio"/> Code Signing <input type="radio"/> Custom										
Extensions	<table><thead><tr><th>Type</th><th>Critical</th><th>Value</th></tr></thead><tbody><tr><td>Key Usage ?</td><td><input checked="" type="radio"/> true</td><td>Digital signature, Key encipherment (required)</td></tr><tr><td>Subject Alternative Name ?</td><td><input checked="" type="radio"/> false</td><td>DNS Name: (required)</td></tr></tbody></table> <div>+ Add Extension</div>		Type	Critical	Value	Key Usage ?	<input checked="" type="radio"/> true	Digital signature, Key encipherment (required)	Subject Alternative Name ?	<input checked="" type="radio"/> false	DNS Name: (required)
Type	Critical	Value									
Key Usage ?	<input checked="" type="radio"/> true	Digital signature, Key encipherment (required)									
Subject Alternative Name ?	<input checked="" type="radio"/> false	DNS Name: (required)									

Elliptic-Curve (EC) Certs feature smaller size and stronger keys

Add Extensions: Key Usage, SAN, Extended Key Usage, Basic Constraints*, CRL Distribution Points

**Basic Constraints supports CAs or Entity*

AUTHENTICATION VIA EMAIL

Maintain security posture using preferred authentication by major email providers: Microsoft (365/Exchange) and Gmail



OUTGOING ACCOUNTS

Used to send out reports, charts and alarms from a station through the smtp transport



INCOMING ACCOUNTS

Used to receive alarm acknowledgements to a station through the pop3 or imap transport

OAuth2, Client
Credential Flow
authentication for
unattended email
integration

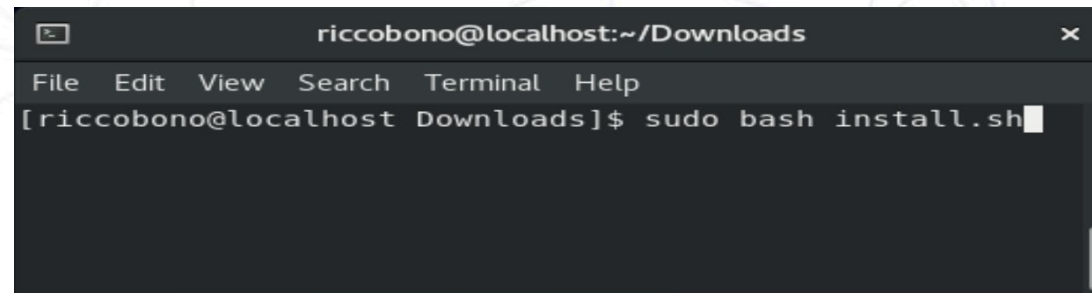
Security
Dashboard Card
to monitor email
service security
best practices



SILENT INSTALL

UNATTENDED INSTALLER

Enabling *Silent Install* allows for automated installation of Niagara Framework via programming. This streamlines PC maintenance, automated testing, and bundling installations with additional applications.



```
riccobono@localhost:~/Downloads
File Edit View Search Terminal Help
[riccobono@localhost Downloads]$ sudo bash install.sh
```

Run a Niagara installer for Windows or Linux without the need for user input

New properties file constructs installation choices prior to execution via the command line

SYSLOG INTEGRATION

Aligns to the IT
standard in
message
logging

Enables
consolidation to a
central repository
for system
management

Meet IT System Administrator requirements for proper audit logging, monitoring, and detection

SyslogPlatformService

Display Name	Value
Platform Service Description	Syslog
Enabled	<input type="radio"/> false
Transport Protocol	Tcp ▾
Server Host	localhost
Server Port	1514 [1 - 65535]
Message Type	Bsd ▾
Client Alias	syslog
Platform Log Enabled	<input checked="" type="checkbox"/> true
Station Log Enabled	<input checked="" type="checkbox"/> true
Workbench Log Enabled	<input checked="" type="checkbox"/> true
Station Audit Enabled	<input checked="" type="checkbox"/> true
Security Audit Enabled	<input checked="" type="checkbox"/> true
Facility	Local0 ▾
Queue Size	1000
Log Level	Info ▾
Station Server Status	{down}
Queue Full Percent Station	0.00 [0.00 - 100.00]
Niagarad Server Status	{down}
Queue Full Percent Niagarad	0.00 [0.00 - 100.00]
🔔 Syslog Server Connection Alarm Support	Platform Alarm Support
🔔 Syslog Message Queue Alarm Support	Platform Alarm Support

HAYSTACK 4 SUPPORT

Haystack 4 encompasses a taxonomy and an ontology. Evolved to capture machine-readable relationships of things along with their contextual data

TagDictionaryService Actions & Topics Slot Details

Display Name	Value	Commands
Status	{ok}	
Fault Cause		
Enabled	true <input checked="" type="checkbox"/>	
Default Namespace Id		
Tag Rule Index Enabled	true <input checked="" type="checkbox"/>	
Indexed Tags		
Neqlize Options	Neqlize Options	
Niagara	Niagara	
Haystack4	Haystack4	<input checked="" type="checkbox"/>

HAYSTACK DICTIONARY

Aligns Niagara Tagging with the latest Haystack Tag Dictionary. Updatable in-place and without a module update from Tridium.

Types Mapping Table

Haystack 4

- marker
- bool
- number
- int
- str
- coord
- scalar
- uri
- date
- dateTime
- time

niagara⁴

- BMarker
- BBoolean
- BDouble
- BInteger
- BString
- BString
- BString
- BString
- BAbsTime
- BAbsTime
- BAbsTime

EASY MIGRATION

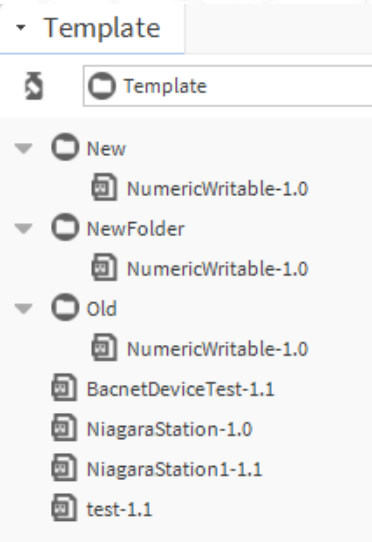
Haystack 4 items equivalent to the Haystack 3 versions are added during migration action.

EDGE TEMPLATE AND DEPLOYMENT TOOLS UPGRADES

Reducing time spent installing, commissioning and configuring multiple Niagara devices using Niagara Provisioning

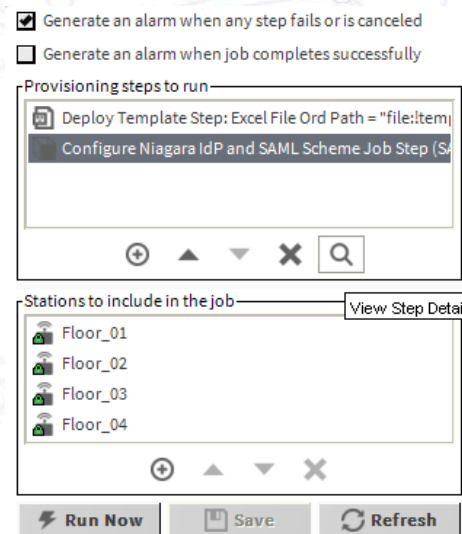
ORGANIZE

Allow users to keep a template library organized with the addition of sub-folders



BULK-DEPLOY

Template Enhancements for easier search and visualization



PROVISION

Edit and modify Job Steps before running a Provisioning Job



Key enhancements for NIAGARA deployments!

CONTAINERIZED NIAGARA

Subscription can be purchased for:

ON PREM

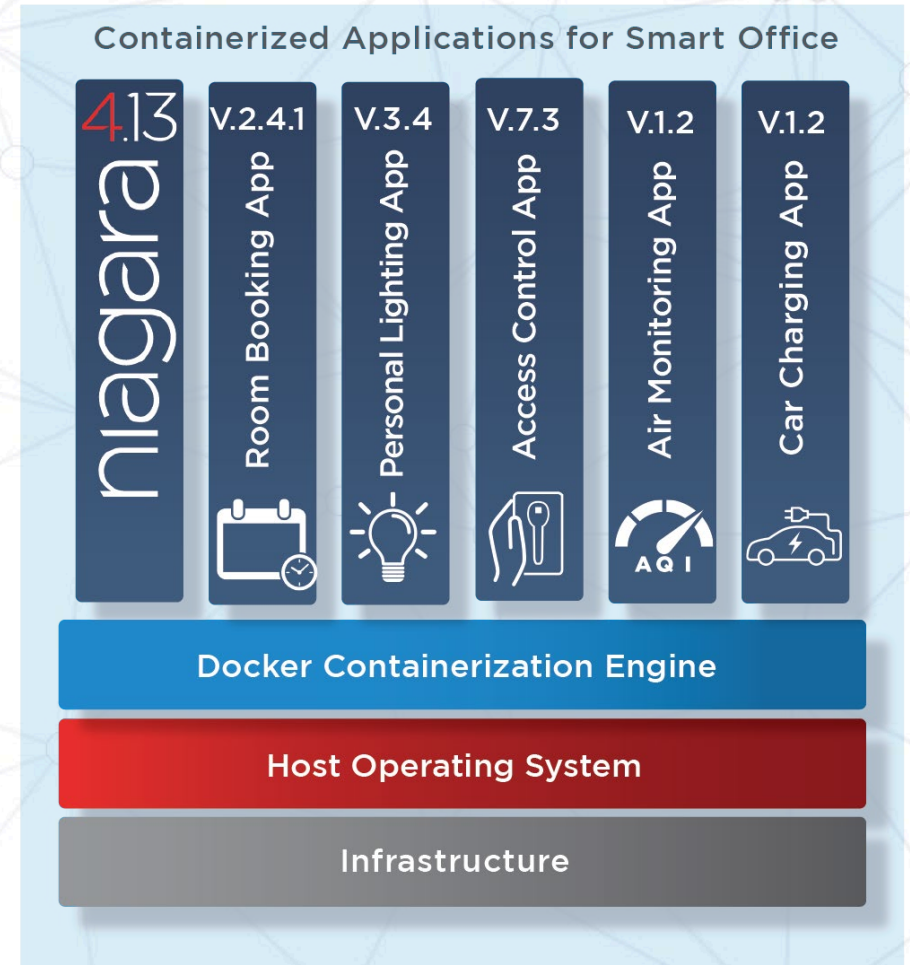
Supervisor deployment on a server device housed locally

CLOUD

Supervisor deployment in a cloud service

HARDWARE EMBED

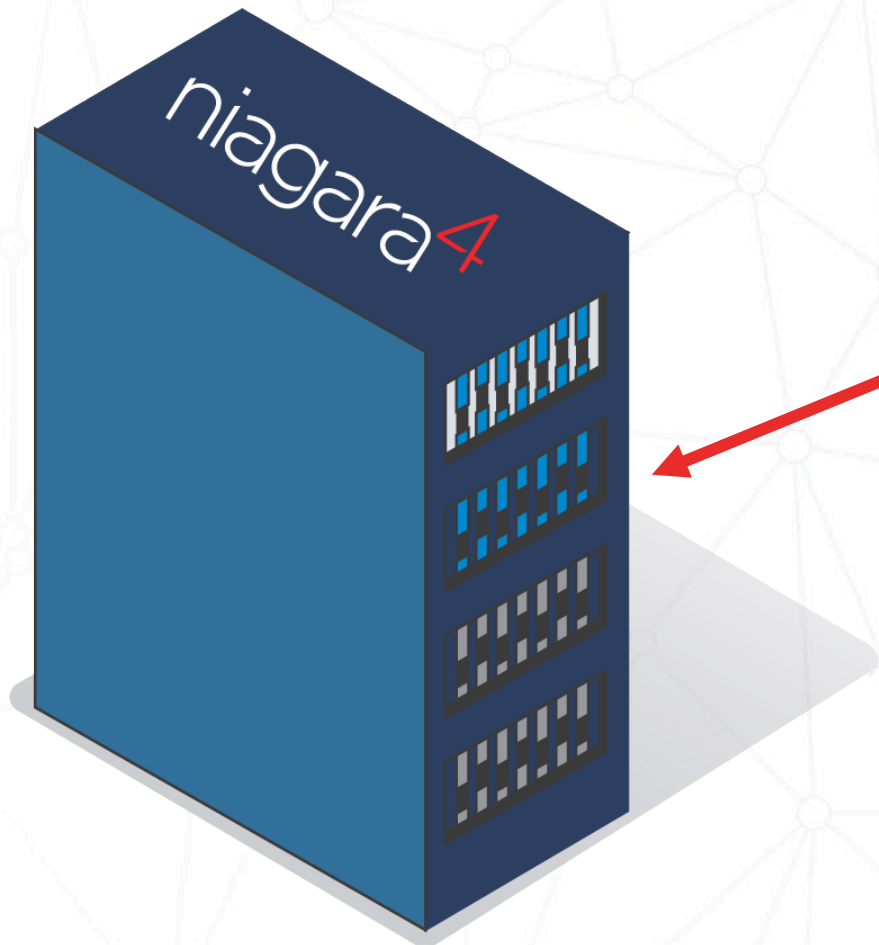
Embedded deployment whereby a Niagara development partner deploys Niagara containers on its own proprietary or a third-party commercial device or server



Example deployment of Containerized Niagara on a partner-built mobile hub.

SUBSCRIPTION LICENSING

SaaS Subscriptions: Purchased using OPex rather than CAPex



More Purchasing Flexibility

niagara
licensing



KEY FEATURES

- Quad core iMX8M+ CPU
- Double the amount of RAM
- 2X the amount of storage
- Ubuntu Core 20 operating system
- Wireless and Non-Wireless model
- Refreshed branding clip
- Easy drop-in replacement/upgrade to JACE-8000
- Supports all existing expansion modules (+R-IO)
- All connectors in same location and same orientation

ROADMAP OBJECTIVES

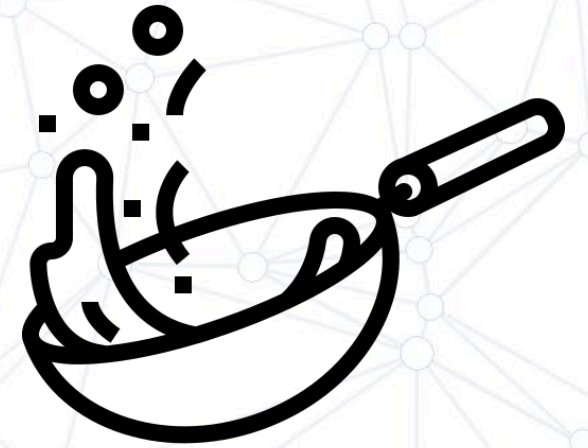
- Remote device management
- Edge computing platform
- Mobile management UI
- Machine learning capabilities (NPU)



	JACE-8000	JACE-9000
Processor	Single Core 1GHz TI AM3522	Quad Core 1.6GHz NXP iMX8M+
Operating System	QNX	Ubuntu Core 20 Linux
Memory	1GB	2GB
Storage	4GB uSD	Min 8GB uSD
RS-485 Ports	2	2
USB Backup	Yes	No
Ethernet	10/100	10/100/1000
Data Recovery	2Mbit	4Mbit
Wi-Fi	2.4GHz	2.4 & 5GHz
Bluetooth	No	Yes
Debug Port	Yes	Yes

niagara TOMORROW

What's Cooking at Tridium HQ



- Certificate Signing Service and Requesters
- BACnet Protocol Rev 16
- Brick Schema Support
- Multi-tiered Security Dashboard
- Specified/Required Auth Types (SAML Auth Scheme)
- Enrollment Workflow for gAuth (MFA)
- Web Views, Web Views, More Web Views
 - NN History Import/Export, Schedule Import/Export, BACnet History Import, Schedule Import/Export, BACnet Export Table, RDBMS Network, NRIO Network, Modbus Network, OnCall Service, Weather Service, Provisioning, Category Browser
- OPC-UA Driver Refresh

and more!



Niagara Access*

- 1, 2, and 4 door controller models
- Niagara Integration – Q4 2023
- OSDP & Weigand
- Multi-class reader support
- QR code credentials
- Biometric credentials
- Mobile credentials
- 12 VDC
- POE
- Connectivity
 - Ethernet
 - Wi-Fi
- Distributed control
- Built on an open framework

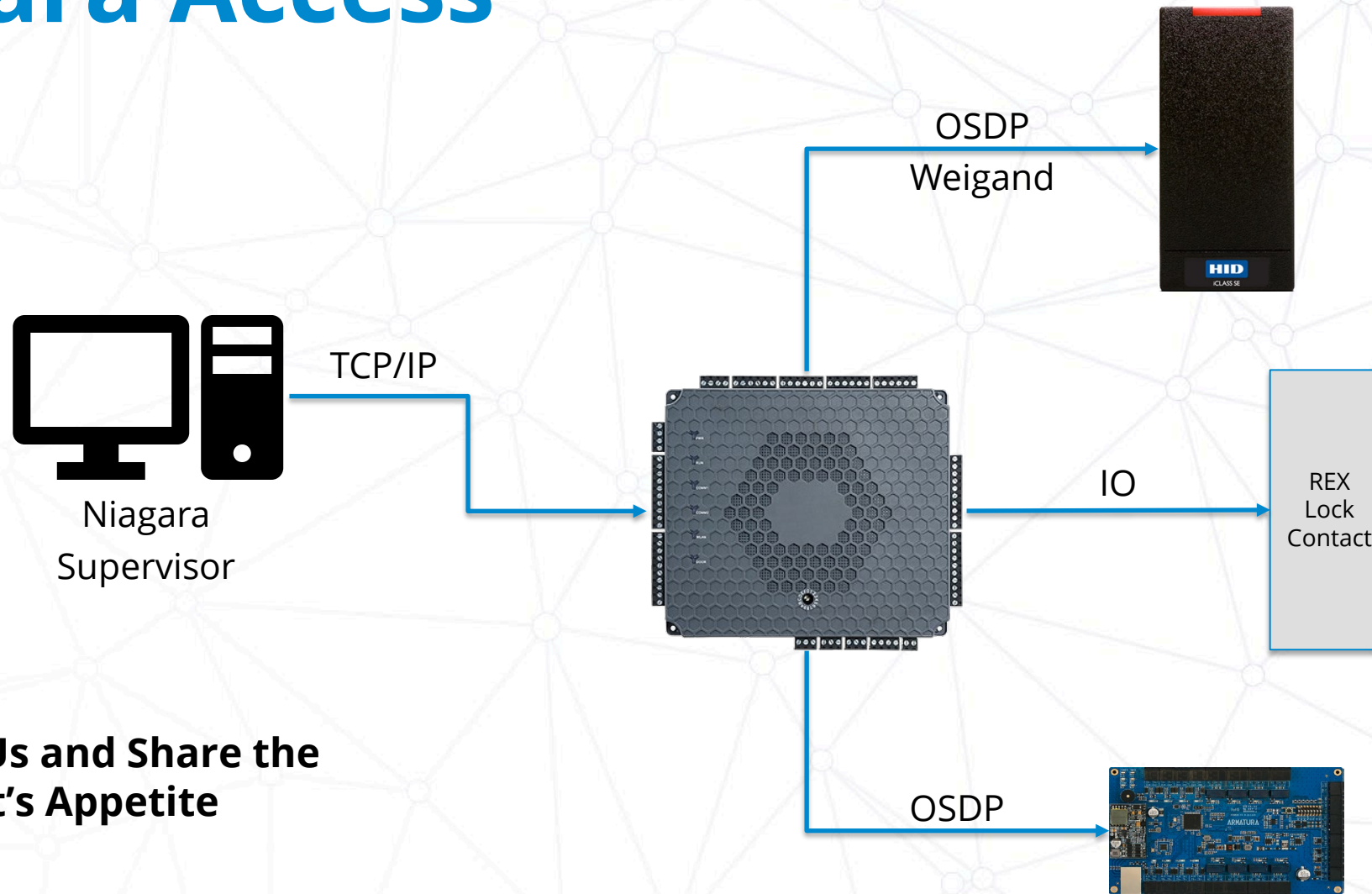


IP Controller



***Early R&D Stages**

Niagara Access*



Come Find Us and Share the Market's Appetite

***Early R&D Stages**